



2006-09-18 4614-0120P seq list.txt
SEQUENCE LISTING

<110> HALKIER, Torben
HAANING, Jesper

<120> Method for Down-Regulating Osteoprotegerin Ligand Activity

<130> 3631-0114P

<140> US 09/396,937

<141> 1999-09-15

<160> 36

<170> PatentIn Ver. 2.1

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Ile Pro Asp Ser Cys Arg Arg Ile Lys Gln Ala Phe Gln Gly Ala Val
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180      185      190
Trp Ala Lys Ile Ser Asn Met Thr Phe Ser Asn Gly Lys Leu Ile Val
195      200      205
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245      250      255
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275      280      285
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Leu Gln Asp Ser Thr 100 Leu Glu Ser Glu Asp Thr 110 Leu Pro Asp Ser Cys 115	
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Gly Ser Trp 150 Leu Asp Val Ala 155 Arg Gly Lys Pro Glu Ala Gln Pro 160	
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Phe Ala His Leu Thr 165 Ile Asn Ala Ala Ser Ile Pro Ser Gly Ser His 170	
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Lys Val Thr Leu Ser 180 Ser Trp Tyr His Asp Arg Gly Trp Ala Lys Ile 195	
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Ser Asn Met Thr 200 Leu Ser Asn Gly Lys Leu Arg Val Asn Gln Asp Gly 210	
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 cac caa cac caa cat caa cat caa cat caa cat caa aaa cct gaa gct 96
 His Gln His Gln His Gln His Gln His Gln His Gln Lys Pro Glu Ala
 20 25 30
 cag cca ttc gct cat ctg acc atc aac gct gca tcg atc cct tct ggt 144
 Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro Ser Gly
 35 40 45
 tct cat aaa gtt acc ctg tct tct tgg tat cac gac cgc ggt tgg gct 192
 Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly Trp Ala
 50 55 60
 aaa atc tct aac atg acc ctg tct aac ggt aaa ctg aga gtt aac cag 240
 Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val Asn Gln
 65 70 75 80
 gac ggt ttc tac tac ctg tac gct aac atc tgt ttc aga cat cac gaa 288
 Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg His His Glu
 85 90 95
 acc tct ggt tct gtt cca acc gac tac ctg cag ctg atg gtt tac gtt 336
 Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val Tyr Val
 100 105 110
 gtt aaa acc tct atc aaa atc cca tct tca cat aac ctg atg aaa ggt 384
 Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met Lys Gly
 115 120 125
 ggt tct acc aaa aac tgg tct ggt aac tct gaa ttc cat ttc tac tct 432
 Gly Ser Thr Lys Asn Trp Ser Gly Asn Ser Glu Phe His Phe Tyr Ser
 130 135 140
 atc aac gtt ggt ggt ttc ttc aaa ctg aga gct ggt gaa gaa atc tct 480
 Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu Ile Ser
 145 150 155 160
 atc cag gtt tct aac cct tct ctg ctg gac cca gac cag gac gct acc 528
 Ile Gln Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln Asp Ala Thr
 165 170 175
 tac ttc ggg gcc ttc aaa gtt cag gac atc gac tag 564
 Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp
 180 185

<210> 8
 <211> 187
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic PCR product with optimum codons for E. coli and P. pastoris expression

<400> 8
 Glu Leu Gly Ser Leu Glu Lys Arg Glu Ala Glu Ala His Val Met Lys
 1 5 10 15
 His Gln His Gln His Gln His Gln His Gln His Gln Lys Pro Glu Ala
 20 25 30
 Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro Ser Gly
 35 40 45
 Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly Trp Ala
 50 55 60
 Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val Asn Gln
 65 70 75 80
 Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg His His Glu
 85 90 95
 Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val Tyr Val
 100 105 110
 Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met Lys Gly
 115 120 125
 Gly Ser Thr Lys Asn Trp Ser Gly Asn Ser Glu Phe His Phe Tyr Ser
 130 135 140
 Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu Ile Ser
 145 150 155 160
 Ile Gln Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln Asp Ala Thr
 165 170 175
 Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp
 180 185

<210> 9
 <211> 519
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: DNA encoding murine OPGL, residues 158-316, fused to His tag

<220>
 <221> CDS
 <222> (1)..(519)

<220>
 <221> misc_binding
 <222> (1)..(42)
 <223> His tag

<220>
 <221> misc_feature
 <222> (43)..(519)
 <223> Murine OPGL, residues 158-316

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<400> 9
atg aaa cac caa cac caa cat caa cat caa cat caa cat caa aaa cct 48
Met Lys His Gln His Gln His Gln His Gln His Gln His Gln Lys Pro
1 5 10 15
gaa gct cag cca ttc gct cat ctg acc atc aac gct gca tcg atc cct 96
Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro
20 25 30
tct ggt tct cat aaa gtt acc ctg tct tct tgg tat cac gac cgc ggt 144
Ser Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly
35 40 45
tgg gct aaa atc tct aac atg acc ctg tct aac ggt aaa ctg aga gtt 192
Trp Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val
50 55 60
aac cag gac ggt ttc tac tac ctg tac gct aac atc tgt ttc aga cat 240
Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg His
65 70 75 80
cac gaa acc tct ggt tct gtt cca acc gac tac ctg cag ctg atg gtt 288
His Glu Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val
85 90 95
tac gtt gtt aaa acc tct atc aaa atc cca tct tca cat aac ctg atg 336
Tyr Val Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met
100 105 110
aaa ggt ggt tct acc aaa aac tgg tct ggt aac tct gaa ttc cat ttc 384
Lys Gly Gly Ser Thr Lys Asn Trp Ser Gly Asn Ser Glu Phe His Phe
115 120 125
tac tct atc aac gtt ggt ggt ttc ttc aaa ctg aga gct ggt gaa gaa 432
Tyr Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu
130 135 140
atc tct atc cag gtt tct aac cct tct ctg ctg gac cca gac cag gac 480
Ile Ser Ile Gln Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln Asp
145 150 155 160
gct acc tac ttc ggg gcc ttc aaa gtt cag gac atc gac 519
Ala Thr Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp
165 170

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<210> 10
 <211> 173
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: DNA encoding
 murine OPGL, residues 158-316, fused to His tag

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<400> 10
Met Lys His Gln His Gln His Gln His Gln His Gln His Gln Lys Pro
1 5 10 15
Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro
20 25 30
Ser Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly
35 40 45
Trp Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val
50 55 60
Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg His
65 70 75 80
His Glu Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val
85 90 95
Tyr Val Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met
100 105 110
Lys Gly Gly Ser Thr Lys Asn Trp Ser Gly Asn Ser Glu Phe His Phe
115 120 125
Tyr Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu

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130 135 140
 Ile Ser Ile Gln Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln Asp
 145 150 155 160
 Ala Thr Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp
 165 170

<210> 11
 <211> 519
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Fusion of
 murine OPGL, residues 158-316 with C to S
 mutation, and His tag

<220>
 <221> CDS
 <222> (1)..(519)

<220>
 <221> misc_binding
 <222> (1)..(42)
 <223> His tag

<220>
 <221> misc_feature
 <222> (43)..(228)
 <223> Murine OPGL, residues 158-219

<220>
 <221> misc_feature
 <222> (232)..(519)
 <223> Murine OPGL, residues 221-316

<220>
 <221> mutation
 <222> (229)..(231)
 <223> tgt (Cys) to tcc (Ser)

<220>

<400> 11
 atg aaa cac caa cac caa cat caa cat caa cat caa cat caa aaa cct 48
 Met Lys His Gln His Gln His Gln His Gln His Gln Lys Pro
 1 5 10 15
 gaa gct cag cca ttc gct cat ctg acc atc aac gct gca tcg atc cct 96
 Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro
 20 25 30
 tct ggt tct cat aaa gtt acc ctg tct tct tgg tat cac gac cgc ggt 144
 Ser Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly
 35 40 45
 tgg gct aaa atc tct aac atg acc ctg tct aac ggt aaa ctg aga gtt 192
 Trp Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val
 50 55 60
 aac cag gac ggt ttc tac tac ctg tac gct aac atc tcc ttc aga cat 240
 Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Ser Phe Arg His
 65 70 75 80
 cac gaa acc tct ggt tct gtt cca acc gac tac ctg cag ctg atg gtt 288
 His Glu Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val
 85 90 95

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tac gtt gtt aaa acc tct atc aaa atc cca tct tca cat aac ctg atg	336
Tyr Val Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met	
100 105 110	
aaa ggt ggt tct acc aaa aac tgg tct ggt aac tct gaa ttc cat ttc	384
Lys Gly Gly Ser Thr Lys Asn Trp Ser Gly Asn Ser Glu Phe His Phe	
115 120 125	
tac tct atc aac gtt ggt ggt ttc ttc aaa ctg aga gct ggt gaa gaa	432
Tyr Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu	
130 135 140	
atc tct atc cag gtt tct aac cct tct ctg ctg gac cca gac cag gac	480
Ile Ser Ile Gln Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln Asp	
145 150 155 160	
gct acc tac ttc ggg gcc ttc aaa gtt cag gac atc gac	519
Ala Thr Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp	
165 170	

<210> 12

<211> 173

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Fusion of murine OPGL, residues 158-316 with C to S mutation, and His tag

<400> 12

Met Lys His Gln His Gln His Gln His Gln His Gln His Gln Lys Pro	
1 5 10 15	
Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro	
20 25 30	
Ser Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly	
35 40 45	
Trp Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val	
50 55 60	
Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Ser Phe Arg His	
65 70 75 80	
His Glu Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val	
85 90 95	
Tyr Val Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met	
100 105 110	
Lys Gly Gly Ser Thr Lys Asn Trp Ser Gly Asn Ser Glu Phe His Phe	
115 120 125	
Tyr Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu	
130 135 140	
Ile Ser Ile Gln Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln Asp	
145 150 155 160	
Ala Thr Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp	
165 170	

<210> 13

<211> 564

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Fusion of murine OPGL, residues 158-316 modified by introduction of tetanus toxoid P30 epitope, and His tag

<220>
 <221> CDS
 <222> (1)..(564)

<220>
 <221> misc_binding
 <222> (1)..(42)
 <223> His tag

<220>
 <221> misc_feature
 <222> (43)..(336)
 <223> Murine OPGL, residues 158-255

<220>
 <221> misc_feature
 <222> (337)..(399)
 <223> Tetanus toxoid P30 epitope

<220>
 <221> misc_feature
 <222> (400)..(564)
 <223> Murine OPGL, residues 262-316

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<400> 13
atg aaa cac caa cac caa cat caa cat caa cat caa cat caa aaa cct 48
Met Lys His Gln His Gln His Gln His Gln His Gln His Gln Lys Pro
  1          5          10          15
gaa gct cag cca ttc gct cat ctg acc atc aac gct gca tcg atc cct 96
Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro
          20          25          30
tct ggt tct cat aaa gtt acc ctg tct tct tgg tat cac gac cgc ggt 144
Ser Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly
          35          40          45
tgg gct aaa atc tct aac atg acc ctg tct aac ggt aaa ctg aga gtt 192
Trp Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val
          50          55          60
aac cag gac ggt ttc tac tac ctg tac gct aac atc tgt ttc aga cat 240
Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg His
          65          70          75          80
cac gaa acc tct ggt tct gtt cca acc gac tac ctg cag ctg atg gtt 288
His Glu Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val
          85          90          95
tac gtt gtt aaa acc tct atc aaa atc cca tct tca cat aac ctg atg 336
Tyr Val Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met
          100          105          110
ttc aac aac ttc acc gtt tct ttc tgg ctg agg gta ccg aaa gtt tct 384
Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser
          115          120          125
gct tct cac ctg gaa aac tgg tct ggt aac tct gaa ttc cat ttc tac 432
Ala Ser His Leu Glu Asn Trp Ser Gly Asn Ser Glu Phe His Phe Tyr
          130          135          140
tct atc aac gtt ggt ggt ttc aaa ctg aga gct ggt gaa gaa atc 480
Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu Ile
          145          150          155          160
tct atc cag gtt tct aac cct tct ctg ctg gac cca gac cag gac gct 528
Ser Ile Gln Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln Asp Ala
          165          170          175
acc tac ttc ggg gcc ttc aaa gtt cag gac atc gac 564
Thr Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp
          180          185

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<210> 14
 <211> 188
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Fusion of
 murine OPGL, residues 158-316 modified by
 introduction of tetanus toxoid P30 epitope, and
 His tag

<400> 14
 Met Lys His Gln His Gln His Gln His Gln His Gln His Gln Lys Pro
 1 5 10 15
 Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro
 20 25 30
 Ser Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly
 35 40 45
 Trp Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val
 50 55 60
 Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg His
 65 70 75 80
 His Glu Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val
 85 90 95
 Tyr Val Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met
 100 105 110
 Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser
 115 120 125
 Ala Ser His Leu Glu Asn Trp Ser Gly Asn Ser Glu Phe His Phe Tyr
 130 135 140
 Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu Ile
 145 150 155 160
 Ser Ile Gln Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln Asp Ala
 165 170 175
 Thr Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp
 180 185

<210> 15
 <211> 546
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Fusion
 between murine OPGL, residues 158-316 with tetanus
 toxoid P2 epitope introduced, and His tag

<220>
 <221> CDS
 <222> (1)..(546)

<220>
 <221> misc_binding
 <222> (1)..(42)
 <223> His tag

<220>
 <221> misc_feature
 <222> (43)..(336)
 <223> Murine OPGL, residues 158-255

<220>
 <221> misc_feature
 <222> (382)..(546)
 <223> Murine OPGL, residues 262-316

<220>
 <221> misc_feature
 <222> (337)..(381)
 <223> Tetanus toxoid P2 epitope

<400> 15
 atg aaa cac caa cac caa cat caa cat caa cat caa cat caa aaa cct 48
 Met Lys His Gln His Gln His Gln His Gln His Gln Lys Pro
 1 5 10 15
 gaa gct cag cca ttc gct cat ctg acc atc aac gct gca tcg atc cct 96
 Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro
 20 25 30
 tct ggt tct cat aaa gtt acc ctg tct tct tgg tat cac gac cgc ggt 144
 Ser Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly
 35 40 45
 tgg gct aaa atc tct aac atg acc ctg tct aac ggt aaa ctg aga gtt 192
 Trp Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val
 50 55 60
 aac cag gac ggt ttc tac tac ctg tac gct aac atc tgt ttc aga cat 240
 Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg His
 65 70 75 80
 cac gaa acc tct ggt tct gtt cca acc gac tac ctg cag ctg atg gtt 288
 His Glu Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val
 85 90 95
 tac gtt gtt aaa acc cct atc aaa atc caa tct tca cat aac ctg atg 336
 Tyr Val Val Lys Thr Pro Ile Lys Ile Gln Ser Ser His Asn Leu Met
 100 105 110
 cag tac atc aaa gct aat tcg aaa ttc atc ggt atc acc gaa ctg aac 384
 Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Asn
 115 120 125
 tgg tct ggt aac tct gaa ttc cat ttc tac tct atc aac gtt ggt ggt 432
 Trp Ser Gly Asn Ser Glu Phe His Phe Tyr Ser Ile Asn Val Gly Gly
 130 135 140
 ttc ttc aaa ctg aga gct ggt gaa gaa atc tct atc cag gtt tct aac 480
 Phe Phe Lys Leu Arg Ala Gly Glu Glu Ile Ser Ile Gln Val Ser Asn
 145 150 155 160
 cct tct ctg ctg gac cca gac cag gac gct acc tac ttc ggg gcc ttc 528
 Pro Ser Leu Leu Asp Pro Asp Gln Asp Ala Thr Tyr Phe Gly Ala Phe
 165 170 175
 aaa gtt cag gac atc gac 546
 Lys Val Gln Asp Ile Asp
 180

<210> 16
 <211> 182
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Fusion
 between murine OPGL, residues 158-316 with tetanus
 toxoid P2 epitope introduced, and His tag

<400> 16
 Met Lys His Gln His Gln His Gln His Gln His Gln His Gln Lys Pro
 1 5 10 15

Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro
 20 25 30
 Ser Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly
 35 40 45
 Trp Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val
 50 55 60
 Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg His
 65 70 75 80
 His Glu Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val
 85 90 95
 Tyr Val Val Lys Thr Pro Ile Lys Ile Gln Ser Ser His Asn Leu Met
 100 105 110
 Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Asn
 115 120 125
 Trp Ser Gly Asn Ser Glu Phe His Phe Tyr Ser Ile Asn Val Gly Gly
 130 135 140
 Phe Phe Lys Leu Arg Ala Gly Glu Glu Ile Ser Ile Gln Val Ser Asn
 145 150 155 160
 Pro Ser Leu Leu Asp Pro Asp Gln Asp Ala Thr Tyr Phe Gly Ala Phe
 165 170 175
 Lys Val Gln Asp Ile Asp
 180

<210> 17
 <211> 519
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Fusion between
 murine OPGL, residues 158-316 with tetanus toxoid
 P2 epitope introduced, and His tag

<220>
 <221> CDS
 <222> (1)..(519)

<220>
 <221> misc_binding
 <222> (1)..(42)
 <223> His tag

<220>
 <221> misc_feature
 <222> (43)..(432)
 <223> Murine OPGL, residues 158-287

<220>
 <221> misc_feature
 <222> (478)..(519)
 <223> Murine OPGL, residues 303-316

<220>
 <221> misc_feature
 <222> (433)..(477)
 <223> Tetanus toxoid P2 epitope

<400> 17
 atg aaa cac caa cac caa cat caa cat caa cat caa cat caa aaa cct 48
 Met Lys His Gln His Gln His Gln His Gln His Gln His Gln Lys Pro
 1 5 10 15

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gaa gct cag cca ttc gct cat ctg acc atc aac gct gca tcg atc cct	96
Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro	
20 25 30	
tct ggt tct cat aaa gtt acc ctg tct tct tgg tat cac gac cgc ggt	144
Ser Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly	
35 40 45	
tgg gct aaa atc tct aac atg acc ctg tct aac ggt aaa ctg aga gtt	192
Trp Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val	
50 55 60	
aac cag gac ggt ttc tac tac ctg tac gct aac atc tgt ttc aga cat	240
Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg His	
65 70 75 80	
cac gaa acc tct ggt tct gtt cca acc gac tac ctg cag ctg atg gtt	288
His Glu Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val	
85 90 95	
tac gtt gtt aaa acc tct atc aaa atc cca tct tca cat aac ctg atg	336
Tyr Val Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met	
100 105 110	
aaa ggt ggt tct acc aaa aac tgg tct ggt aac tct gaa ttc cat ttc	384
Lys Gly Gly Ser Thr Lys Asn Trp Ser Gly Asn Ser Glu Phe His Phe	
115 120 125	
tac tct atc aac gtt ggt ggt ttc ttc aaa ctg aga gct ggt gaa gaa	432
Tyr Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu	
130 135 140	
cag tac atc aaa gct aat tcg aaa ttc atc ggt atc acc gaa ctg gac	480
Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Asp	
145 150 155 160	
gct acc tac ttc ggg gcc ttc aaa gtt cag gac atc gac	519
Ala Thr Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp	
165 170	

<210> 18

<211> 173

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Fusion between murine OPGL, residues 158-316 with tetanus toxoid P2 epitope introduced, and His tag

<400> 18

Met Lys His Gln His Gln His Gln His Gln His Gln His Gln Lys Pro	
1 5 10 15	
Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro	
20 25 30	
Ser Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly	
35 40 45	
Trp Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val	
50 55 60	
Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Arg His	
65 70 75 80	
His Glu Thr Ser Gly Ser Val Pro Thr Asp Tyr Leu Gln Leu Met Val	
85 90 95	
Tyr Val Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met	
100 105 110	
Lys Gly Gly Ser Thr Lys Asn Trp Ser Gly Asn Ser Glu Phe His Phe	
115 120 125	
Tyr Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu	
130 135 140	
Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Asp	
145 150 155 160	

Ala Thr Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp
165 170

<210> 19

<211> 519

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Fusion between murine OPGL, residues 158-316 with tetanus toxoid P30 epitope introduced, and His tag

<220>

<221> CDS

<222> (1)..(519)

<220>

<221> misc_binding

<222> (1)..(42)

<223> His tag

<220>

<221> misc_feature

<222> (43)..(231)

<223> Murine OPGL, residues 158-220

<220>

<221> misc_feature

<222> (295)..(519)

<223> Murine OPGL, residues 242-316

<220>

<221> misc_feature

<222> (232)..(294)

<223> Tetanus toxoid P30 epitope

<400> 19

atg	aaa	cac	caa	cac	caa	cat	caa	cat	caa	cat	caa	aaa	cct	48
Met	Lys	His	Gln	His	Gln	His	Gln	His	Gln	His	Gln	Lys	Pro	
1				5				10				15		
gaa	gct	cag	cca	ttc	gct	cat	ctg	acc	atc	aac	gct	gca	tcg	96
Glu	Ala	Gln	Pro	Phe	Ala	His	Leu	Thr	Ile	Asn	Ala	Ala	Ser	
			20					25				30	Ile	
tct	ggt	tct	cat	aaa	gtt	acc	ctg	tct	tct	tgg	tat	cac	gac	144
Ser	Gly	Ser	His	Lys	Val	Thr	Leu	Ser	Ser	Trp	Tyr	His	Asp	
		35					40				45		Arg	
tgg	gct	aaa	atc	tct	aac	atg	acc	ctg	tct	aac	ggt	aaa	ctg	192
Trp	Ala	Lys	Ile	Ser	Asn	Met	Thr	Leu	Ser	Asn	Gly	Lys	Leu	
		50				55					60		Arg	
aac	cag	gac	ggt	ttc	tac	tac	ctg	tac	gct	aac	atc	tgt	ttc	240
Asn	Gln	Asp	Gly	Phe	Tyr	Tyr	Leu	Tyr	Ala	Asn	Ile	Cys	Phe	
		65			70				75				80	
ttc	acc	gtt	tct	ttc	tgg	ctg	agg	gta	ccg	aaa	gtt	tct	gct	288
Phe	Thr	Val	Ser	Phe	Trp	Leu	Arg	Val	Pro	Lys	Val	Ser	Ala	
			85					90					95	
ctg	gaa	gtt	aaa	acc	tct	atc	aaa	atc	cca	tct	tca	cat	aac	336
Leu	Glu	Val	Lys	Thr	Ser	Ile	Lys	Ile	Pro	Ser	Ser	His	Asn	
			100					105					110	
aaa	ggt	ggt	tct	acc	aaa	aac	tgg	tct	ggt	aac	tct	gaa	ttc	384
Lys	Gly	Gly	Ser	Thr	Lys	Asn	Trp	Ser	Gly	Asn	Ser	Glu	Phe	

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115	120	125	
tac tct atc aac gtt ggt ggt ttc ttc aaa ctg aga gct ggt gaa gaa			432
Tyr Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu			
130	135	140	
atc tct atc cag gtt tct aac cct tct ctg ctg gac cca gac cag gac			480
Ile Ser Ile Gln Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln Asp			
145	150	155	160
gct acc tac ttc ggg gcc ttc aaa gtt cag gac atc gac			519
Ala Thr Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp			
165	170		

<210> 20
 <211> 173
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Fusion between murine OPGL, residues 158-316 with tetanus toxoid P30 epitope introduced, and His tag

<400> 20	
Met Lys His Gln His Gln His Gln His Gln His Gln His Gln Lys Pro	
1	5
Glu Ala Gln Pro Phe Ala His Leu Thr Ile Asn Ala Ala Ser Ile Pro	
20	25
Ser Gly Ser His Lys Val Thr Leu Ser Ser Trp Tyr His Asp Arg Gly	
35	40
Trp Ala Lys Ile Ser Asn Met Thr Leu Ser Asn Gly Lys Leu Arg Val	
50	55
Asn Gln Asp Gly Phe Tyr Tyr Leu Tyr Ala Asn Ile Cys Phe Asn Asn	
65	70
Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser Ala Ser His	
85	90
Leu Glu Val Lys Thr Ser Ile Lys Ile Pro Ser Ser His Asn Leu Met	
100	105
Lys Gly Gly Ser Thr Lys Asn Trp Ser Gly Asn Ser Glu Phe His Phe	
115	120
Tyr Ser Ile Asn Val Gly Gly Phe Phe Lys Leu Arg Ala Gly Glu Glu	
130	135
Ile Ser Ile Gln Val Ser Asn Pro Ser Leu Leu Asp Pro Asp Gln Asp	
145	150
Ala Thr Tyr Phe Gly Ala Phe Lys Val Gln Asp Ile Asp	
165	170

<210> 21
 <211> 68
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic PCR primer

<400> 21	
agctgcagggt agtcggttgg aacagaacca gaggtttcgt gatgtctgaa acagatgtta	60
gcgtacag	68

<210> 22

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<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PCR
      primer

<400> 22
ctcatctgac catcaacgct gcat 24

<210> 23
<211> 64
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PCR
      primer

<400> 23
tttcggtacc ctcagccaga aagaaacggt gaagttgttg aaacagatgt tagcgtacag 60
gtag 64

<210> 24
<211> 61
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PCR
      primer

<400> 24
tgagggtacc gaaagtttct gcttctcacc tggaagttaa aaccctatc aaaatccaat 60
c 61

<210> 25
<211> 63
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PCR
      primer

<400> 25
tttcggtacc ctcagccaga aagaaacggt gaagttgttg aacatcaggt tatgtgaaga 60
ttg 63

<210> 26
<211> 62
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PCR
      primer

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<400> 26
tgagggtacc gaaagtttct gcttctcacc tggaaaactg gtctggtaac tctgaattcc 60
at 62

<210> 27
<211> 79
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PCR
primer

<400> 27
tacctgcagc tgatgggtta cgttggttaa acccctatca aaatccaatc ttcacataac 60
ctgatgcagt acatcaaag 79

<210> 28
<211> 83
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PCR
primer

<400> 28
tggaattcag agttaccaga ccagttcagt tcggtgatac cgatgaattt cgaattagct 60
ttgatgtact gcatcagggt atg 83

<210> 29
<211> 49
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PCR
primer

<400> 29
gaatttcgaa ttagctttga tgtactgttc ttcaccagct ctcagtttg 49

<210> 30
<211> 53
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic PCR
primer

<400> 30
gctaattcga aattcatcgg tatcaccgaa ctggacgcta cctacttcgg ggc 53

<210> 31
<211> 26
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic PCR primer

<400> 31

cttactagtc gatgtcctga actttg

26

<210> 32

<211> 74

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic PCR primer

<400> 32

agtggaattc agagttacca gaccagtttt tggtagaacc acctttcatc aggttatgtg 60
aagatgggat ttg 74

<210> 33

<211> 65

<212> DNA

<213> Clostridium tetani

<400> 33

actacctgca gctgatgggt tacgttggtt aaacctctat caaaatccca tcttcacata 60
acctg 65

<210> 34

<211> 15

<212> PRT

<213> Clostridium tetani

<400> 34

Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu
1 5 10 15

<210> 35

<211> 21

<212> PRT

<213> Clostridium tetani

<400> 35

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser
1 5 10 15
Ala Ser His Leu Glu
20

<210> 36

<211> 13

<212> PRT

<213> Artificial Sequence

<220>

<223> Pan DR Epitope (PADRE) Peptide

<400> 36

Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala
1 5 10